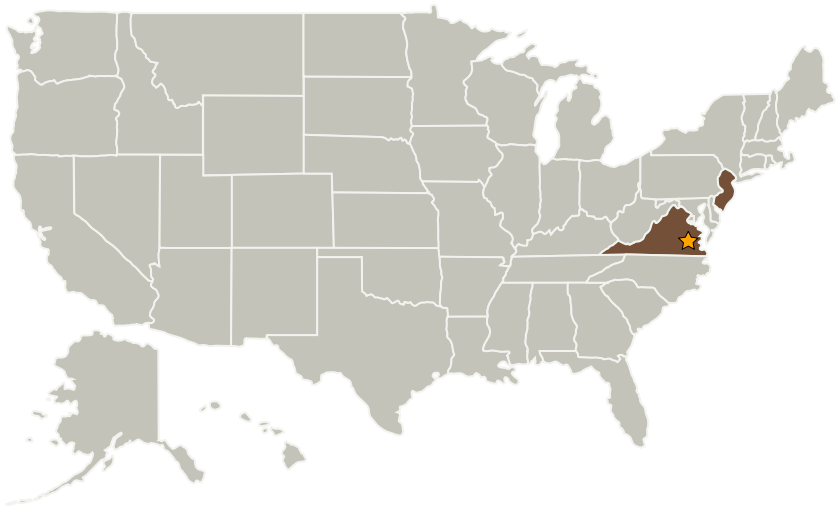
Nonlinear Time Reversal Acoustic Method of Friction Stir Weld Assessment, Phase I

Completed Technology Project (2009 - 2009)

Project Introduction

The goal of the project is demonstration of the feasibility of Friction Stir Weld (FSW) assessment by novel Nonlinear Time Reversal Acoustic (TRA) method. Time reversal acoustic focusing provides the means to concentrate sound energy at any point in a material, inducing elastic nonlinear effects in the focal area. The level on nonlinearity depends on crack and defect presence and measurements of nonlinear effects in TRA focused wave are the basis of the proposed Nonlinear TRA NDE method. This method is especially sensitive to detection of kissing bond that is difficult to detect by other methods. The experimental setups for measurements of local nonlinearity in FSW will be developed and results of the measurements will be compared with the standard weld NDE methods including dye penetrant, radiographic and ultrasonic inspection.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Artann Laboratories, Inc.	Supporting Organization	Industry	Lamberville, New Jersey

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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New Jersey	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.8 Measurement and Control